

ET High Risk List

Preliminary

Following is the list of inputs received to date in response to the action to identify the top risks on the External Tank. **It is in a "raw, unedited" format and content.**

1. EPA regulations on ET materials
2. Future material supplier changes causing extensive requal.
3. Loss of corporate knowledge
4. Lack of communication
5. Not following requirements and specifications in testing, manufacturing and material selection
6. Process control of suppliers.
7. Loss of experienced personnel from the program, both contractor and government.
8. Complex repairs (R10 or more) of AL2195 resulting in cryogenic inversion.
9. TPS Debond caused by (a) material deficiency, (b) Improper application, (c) degradation of the TPS during transport, propellant loading, or ascent (d) Heater malfunction which exceeds TPS bondline capability, (e) Purge malfunction (overtemperature), (f) LO2/LH2 Tank Buckling, (g) Propellant leaks, (h) Overheated pressurization gas.
10. Loss of TPS caused by lightning strike.
11. TPS supportability: Availability of foam components, lack of understanding of sensitivity of foam performance to changes in foam processing, material component changes and environments, and limited insight into vendor changes.
12. Lightning strike provides an ignition source resulting in fire and/or explosion or damages the tank directly. This risk is caused by insufficient lightning protection combined with lightning strike.
13. Partially Open GO2/GH2 Vent/Relief Valve Indicated Closed. Design tolerance in the GO/GH vent/relief valve position indicator switch.
14. Hydrogen Venting in Flight. Two false low LH2 tank ullage pressure indications in separate ullage pressure transducers or associated circuitry or one low indication during intact aborts with single engine failure.
15. Limited insight into vendor changes and their process control implementation.
16. Missed flaw following post proof NDE with possible failure in flight.
17. Things overlooked in the manufacturing process, such as planishing of the wrong weld, leaving one in an unplanished condition.
18. Loss of corporate knowledge at MAF and NASA with lots of old timers retiring or taking buyout.
19. Too much work and not enough time to really get up to speed on areas of responsibility The new OMRSD system
20. The new LCC system
21. It was recently discovered that a Level 2 ICD that was wrong and has been wrong since the early 90's when the system was converted. A typo for a dimension was made concerning cork thickness (it is believed) on the SRB side of the ET/SRB RSS fairing cover during the conversion which was the root cause of an interference

problem just discovered. How many other mistakes were made during this conversion that have not been found?

22. Unknown vendor and supplier process changes, including sub-vendors/suppliers.
23. Scrim cloth change
24. Flame retardant in SS-1171
25. Wipe cloth process change
26. Unknown vendor/suppliers' failure to follow requirements.
27. BSTRA heat treat issue (sub-tier vendor)
28. Use of wrong weld rod by vendor (Arrowhead)
29. Wide panel "philosophy" for flight clearance
30. Vendor hardware which is installed on the ET and which Lockheed Martin is not responsible for "touching"
31. Incorporation of upgrades/redesigns and new technology into production. Many things are verified by analysis and/or similarity, there is a risk that some hidden system level effect may be overlooked in the verification process.

Suggest classifying the list by flight safety , supporting flight rate, launch delays, etc.